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AUTHOR	Oddie, G. B.
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ABSTRACT

In a controlled experiment, the IIEP attempted to develop efficient teaching materials in the field of educational planning. Informal instructional materials were compiled from the tape recordings, transcriptions, and summary notes of seminars, lectures, and discussions conducted by the IIEP in its training and research program. This instructional unit concentrates on those aspects of educational building that are of interest to planners who must determine the planned level of investment in building for an educational development program. Related documents are EA 0[illegible] 931-941. (RA)

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The Fundamentals of Educational Planning : Lecture - Discussion Series

No. 55 DEVELOPMENT AND ECONOMY IN EDUCATIONAL BUILDING

by G.B. Oddie

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INTERNATIONAL INSTITUTE FOR EDUCATIONAL PLANNING
9, rue Eugène-Delacroix
Paris, 16e, France

DEVELOPMENT AND ECONOMY IN EDUCATIONAL BUILDING

by

G.B. Oddie

(Department of Architecture, the University of Edinburgh)

based on a Lecture given at the IIEP
on Wednesday, 6 May 1970

This document is part of 'Fundamentals of Educational Planning: lecture-Discussion Series', designed by the IIEP to provide basic training materials in the field of educational planning. By their very nature these materials, which draw upon tape recordings, transcriptions and summary notes of seminars, lectures and discussions conducted by IIEP as part of its training and research programme, are informal and not subject to the type of editing customary for published documents. They are therefore not to be considered as 'official publications'.

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Introduction

This paper concentrates on those aspects of educational building which are of most interest to educational planners who are likely to have to determine the planned level of investment in educational building for an educational development programme.

In many countries I have visited planners set investment targets which are justifiable in terms of needs but which take too little account of a scarcity of resources, not only of money but also of materials and of professional and industrial manpower. All countries, even if rich, have to balance aspirations with resources and the problem of striking this balance lies at the root of planning for building investment. Because resources are always scarce it is important not only to strike the proper balance in settling the planned level of investment, but also to ensure that such investment provides an adequate return in the quantity and quality of school accommodation which is built for it. Many countries fail to plan the return which they expect for the planned investment, and neglect the steps necessary to ensure that the planned return is in fact obtained. I hope to indicate ways in which the level of investment can be determined and related to the planned return and to show that both investment and return demand consideration of implementation. In doing so it will be necessary to touch on some implications for government mechanisms.

1. A Unit of Measure

Clearly investment and return cannot be related without a unit of measure for school accommodation. The best unit of measure is the pupil place, defined as follows:-

A pupil-place is the amount of floor area needed for each pupil enrolled in a school where the total number of enrolments is the maximum number of pupils who, without overcrowding, can follow the curricula of the school. Implicit in this definition is a connection with standards. For instance "the maximum number of pupils who, without overcrowding can follow the curricula of the school", implies a connection between the standard of accommodation and the kinds of activity which go on in the school.

While one school building may satisfactorily accommodate a range of curricula, ranges of curricula which differ widely from each other will require correspondingly different ranges of accommodation. Thus a pupil place in primary education will not be the same as a pupil place in secondary education or as a student-place in higher education. But, provided a distinction is maintained between different levels and sectors of the educational system, a pupil-place or student-place, as defined, remains the best unit for measuring the amount of accommodation which has to be provided in return for a planned amount of expenditure.

2. Number of Pupil-places

To determine the level of investment needed, therefore, it is necessary first

to calculate, level by level and sector by sector, the number of pupil-places needed. For this the following formula can be used.

$$N_t = P_1 + E_t - \left[N_1 \quad 1 - \frac{nt}{N_1} \quad + A \right]$$

where N_t = number of new places required by year t,

P_1 = number of pupils in system at year 1,

E_t = number of new recruits to system by year t,

N_1 = number of pupil places (as defined) existing in year 1.

$\frac{nt}{N_1}$ = proportion of N_1 expected to be unused (i.e. rendered redundant by migration) or/and irremediably sub-standard by year t.

A = additional places made available in existing schools by adaptation to improve balance between accommodation and curriculum load.

3. Migration and Overcrowding

All countries need new school places simply as the result of population movement to areas such as new housing developments which have previously been without schools of any kind or without suitable schools. Such movement may be occasioned both by drift from rural to urban areas, (a marked feature of developing countries) and by movement from derelict or decaying aeras within urban agglomerations themselves. The result will be an irreversible reduction of usable places in the existing stock of schools, leading to overcrowding of the usable places which remain. Thus new places are needed both to provide for expected future migration and to relieve overcrowding due to migration which has already occurred.

4. Sub-standard schools

Some existing schools will probably be seriously and irremediably substandard. Some of these will be included among the places made irreversibly unusable by emigration. The remainder will further deplete the real value of the existing stock of schools.

The two paragraphs above explain $\frac{nt}{N_1}$ in the formula.

5. Intensified Use of Existing Stock

The stock of schools remaining after unusable or sub-standard buildings have been written off will probably contain a range of accommodation which is out of balance with the range of curricula to be accommodated. By suitable adaptation or, where possible extension, the enrolment capacity of this remaining stock could be considerably increased. Hence A, the extra places so obtained.

In applying the formula a number of refinements need to be taken account of. Most important of these is whether shift working is to be adopted in places where the stock of schools compares so unfavourably with the number of pupils that the only practical expedient is to have half of the children in school for half of the day and the other half for the other half. In that case Nt must be modified by a factor of 50%, or perhaps by a factor of 70%, because shift-work seldom produces a directly proportional saving. All this requires much preliminary study before a plan can be formulated.

6. Cost of New Places

The total cost of all new places needed is thus the cost of Nt + the cost of A.

This of course raises the question of how much one new pupil place should cost. For a detailed examination of the constituents or components of school building cost see my "School Building Resources and their Effective Use" OECD 1965. Here an outline will suffice: the total cost of bringing a new school into operation comprises six elements which have to be taken into account. The six are as follows:-

1. Land purchase, purchase of the land on which it is built;

2. The preparation and servicing of the building site. For instance, provision of access roads, drainage and water supply; earth works, landscaping, etc. This can be of quite a considerable cost in many cases where it is the duty of local authorities to provide sites; and as they use sites that nobody else wants, they usually have to spend a lot of money putting them in order before they can build on them. What is really needed here is a physical planning policy which ensures that when any new developments take place, particularly where financed by a private entrepreneur, then some suitable sites are left over from the profitable development area in order to accommodate social buildings like schools.

3. The building itself.

4. Furniture, fittings and furnishings.

5. Teaching equipment, apparatus and books;

6. Overheads, particularly the cost of professional manpower in designing the building itself.

These are capital costs. But many countries are burdening themselves with buildings which are not really giving full value for money because no provision has been made for maintaing them. Very good schools have been built remarkably cheaply and have, in fact, been provided with an excellent and economical heating system, but the heating system is never used because the local commune is too

mean or too poor to provide the money to run it. Therefore, it is desirable in some way to look at the running costs at the same time as planning the capital costs.

Land purchase is an item of cost which is often beyond control because land cost depends so much on local market conditions. It seems desirable that site procurement should be planned further ahead; and there is a strong case in urban areas for over-provision, initially, of sites to allow for expansion later on. In my report to OECD on this subject, I ventured to suggest that "Where market prices have reached prohibitive levels, the provision of school sites should be included in any consideration that might be given to land reform".

As far as the building itself is concerned, the cost is made up of two parts: the part of the building which goes down into the ground, and this is subject to a fair amount of variation and is difficult to predict because each site is different. That proportion of the cost, however, probably seldom accounts for more than 10% of the total. The other 90%, that part of the building which is above ground level can be subject to very strict control because the total cost is simply a function of the superficial floor area times the cost per square metre, or per square foot of floor area. The designer can control the amount of floor area he provides and, to a large extent if not totally, he can control the amount of expenditure per square metre. The techniques for doing this are well developed in countries like the United Kingdom where the cost accounting of buildings is very well done, but in countries where even the builder himself does not really know where his money has gone, considerable difficulty can arise and it is necessary to have some experimental projects in order to see how one can in fact analyse cost in a realistic way.

If a balance can be struck between aspirations and resources, then a standard can be defined, in terms of floor area and environmental conditions, which, by and large, is reflected in a standard cost. Such a standard cost then forms the basis for ensuring that the planned investment will produce the planned return. Thus a pupil place in a particular sector will require so many square metres of accommodation providing certain environmental conditions, and those so many square metres will cost so much per square metre with a consequent standard cost per pupil place.

7. Implementation

In some countries planning has an air of unreality. In a recent case the development plan called for 22,000 new school places to be provided for the sum of money which had been included in the plan for that purpose. Only 10,000 (less than half) places were in fact provided within the period of the plan, and only then at a cost which exceeded the planned amount by 3%. An error so large makes nonsense of planning. The causes of such nonsense are twofold. First no way has been found of making forward estimates reliable along lines suggested above, nor has an effective system of cost control been operated. Secondly no account has been taken of the constraints of implementation. The finance may be available but resources of manpower or materials are not.

To overcome these difficulties the rate of implementation, the rate at which the planned investment occurs, must be matched to the resources of the building industry. This done, the programme should then list all schools to be completed in a given period, the list stating the precise location of each school, its type and size, the money planned to be spent on its construction and equipment and the date when it is due to be occupied. This planned implementation then needs a counterpart in a corresponding system for checking how well implementation goes according to plan and for stimulating corrective action.

8. Government Mechanisms

In a successful system for implementing an investment programme are several implications for governmental mechanisms. Conceivably four ministries might be involved with a building investment programme and its implementation. Although the variations on such a pattern are almost infinite, these four ministries might be, for example: Finance; Planning; Education; and Public Works.

The Ministry of Education will perhaps determine overall needs, decide priorities and list the named schools to be completed over a given period. This it will do in the light of data and projections supplied by the Ministry of Planning which has an overview of all other sections of social and economic activity. How fast the priorities can be met depends on the Ministry of Finance. Executive responsibility for producing the buildings themselves is the task of the Ministry of Public Works.

If planning and implementation are to be jointly successful these four government mechanisms need to be seen as a system of balanced forces. The Ministries of Finance and Planning balance resources and aspirations over the economy as a whole. The Ministries of Planning and Education do the same for the educational sector. The Ministry of Education is then concerned to see that implementation proceeds at the planned rate and the Ministry of Works is concerned to meet the pressures thus imposed. Desirably the pressures and counter-pressures thus set up need to be explicitly recognised. Considerable increases in efficiency are conceivable if the Ministry of Planning were to set up targets for the number of new pupil places to be provided over a given period, and if the Ministry of Education were then to be answerable for showing how it proposed to meet these targets in terms of individual named and listed buildings. The Ministry of Works should share some responsibility with the Ministry of Planning for ensuring that the planned rate of implementation was realistic, but once this has been agreed it should bear full responsibility for maintaining the planned rate in accordance with the Ministry of Education's listed projects and for reporting progress either to the latter or to the Planning Ministry direct.

Two major conclusions may be drawn from this review. First the planning and preparation of a building programme, if realistic, if economically and educationally effective, can not be carried out by some foreign expert in the course of a three-week mission! It requires considerable data, a powerful

data-gathering force, and in some cases considerable time for controlled experiment to improve cost-accounting, cost analysis and cost control. Secondly planned investment is ineffectual without corresponding planning and control of implementation and to achieve the latter some restructuring may be needed of government mechanisms themselves.